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10/692,495	10/24/2003	Abhijeet Gole	5693P029	1876
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NETWORK APPLIANCE/BLAKELY 1279 OAKMEAD PARKWAY SUNNYVALE, CA 94085-4040			EXAMINER VO, THANH DUC	
			ART UNIT 2189	PAPER NUMBER
			MAIL DATE 01/25/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/692,495

Applicant(s)

GOLE ET AL.

Examiner

Thanh D. Vo

Art Unit

2189

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,6-8,10,12,14,15,17 and 19-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6-8,10,12,14,15,17,19-21 and 23-27 is/are rejected.
- 7) ☒ Claim(s) 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. This Office Action is responsive to the Amendment filed on November 02, 2007. Claims 1, 3-4, 6-8, 10, 12, 14-15, 17, and 19-27 are presented for examination. Claims 1, 3-4, 6-8, 10, 12, 14-15, 17, and 19-27 are pending. All objections or rejections not repeated below are withdrawn.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanai et al. (6,502,205).

As per claim 21, Yanai et al. disclose a method of mirroring data, the method comprising, the method comprising:

operating a destination storage server to maintain a plurality of mirror volumes (Fig. 4, disk drive in secondary storage server) in a non-volatile mass storage subsystem (Fig. 1, disk array), wherein each mirror volume mirrors a corresponding one of a plurality of source volumes maintained by a plurality of source storage servers that are coupled to communicate with the destination storage server (col. 2, lines 60-65);  
receiving, at the destination storage server, write requests from the plurality of source storage servers, each said write request corresponding to a write request

received by one of the plurality of source storage servers from a storage client for updating one of the plurality of source volumes (col. 2, lines 60-67);

operating the destination storage server to store the write requests temporarily prior to synchronizing the mirror volumes with the source volumes, including storing a log of the write requests received by the destination storage server from the plurality source storage servers in a non-volatile random access memory (col. 18, lines 5-9) in the destination storage server (col. 32, lines 49-58),

using the destination storage server to maintain a plurality of files in a non-volatile mass storage subsystem, each said file corresponding to a separate one of the plurality of source storage servers, and storing each write request received by the destination storage server from a source storage server in one of said files which corresponds to said source storage server (col. 32, lines 59-67); and

in response to receiving a specified signal from the source storage server, operating the destination storage server to synchronize the plurality of mirror volumes with the plurality of source volumes based on the write requests received from the plurality of source storage servers (col. 32, lines 49-58, wherein a specified signal from the source storage server is inherent in Yanai et al. in order to perform the operation in the cited lines and column).

Although Yanai discloses log file and data file in singular term but such log file and data file illustrate in Fig. 12 is readily apparent to one having an ordinary skill in the art to comprise multiple data files because the storage system of Yanai are storage servers, wherein storage servers are apparently being used to storage a mass amount

of data which collectively comprising mass amount of data files (See col. 33, lines 10-26, wherein Yanai et al. discloses various files). In addition, because the secondary storage system is mirroring with the primary storage system, therefore each file in the destination storage system is corresponding to each file of the primary storage system.

As per claim 23, Yanai et al. discloses a method, wherein each partition of the partitioned non-volatile random access memory in each of the source storage servers corresponds to a distinct one of the plurality of files in the non-volatile mass storage subsystem. See Fig. 12, items 293 and 294, wherein the log file is corresponding to the data file.

3. Claims 1, 3, 4, 6, 10, 12, 14-15, and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanai et al. (US Patent 6,502,205) in view of Courts et al. (US Patent 5,636,360)

As per claims 1, 10, and 24, Yanai et al. discloses a method for mirroring data comprising:

receiving at a first storage server (Fig. 1, item 14) a data access request from a client (Fig. 1, item 12) coupled to the first storage server 14 (See col. 2, line 60 - col. 3, line 9);

writing the data access request to a first portion of a non-volatile storage device (Fig. 1, item 28) in the first storage server (col. 7, line 66 – col. 8, line 1);

transmitting the data access request from the first storage server 14 to a second storage server (Fig. 1, item 46), wherein the second storage server writes the data to the data access request into a file stored in a mass storage device (Fig. 1, item 48) on the second storage server (See col. 10, lines 51-55);

applying the data access request in the first portion of the non-volatile storage device to a volume managed by the first storage server and causing the second storage server to apply the data access request in the file stored in the mass storage device to an image volume of the volume, wherein the second storage server manages the image volume and the mass storage device. See Fig. 12, col. 32, lines 49-67, wherein the secondary volume is an image of primary volume and the primary volume is managed by the primary storage system and the secondary volume is managed by the secondary storage system. In addition, non-volatile storage device and mass storage device are equivalent to the disk drives in the primary and secondary storage system to make up the volumes.

Yanai et al. does not particular teach when a log file is full then the data is transferred to the log file of the secondary storage device.

Court et al. teaches a method of copying the contents of a log buffer to a log partition when the log buffer is full (col. 2, lines 35-37).

Therefore, it would have been obvious to one having an ordinary skill in the art at the time of the Applicant invention modify the cache of Yanai et al. to implement the method teaches by Court et al. to arrive at the current invention. The motivation of doing so is to avoid the data currently storing in the cache to be overwritten by the

incoming data when the data currently storing in the cache are critical or valuable data as being taught by Yanai et al. at col. 1, lines 47-56.

Yanai et al. and Court et al. do not particularly disclose the second storage server uses the file to recover the data in the image volume if a disaster occurs.

Yanai et al., however, discloses a method of restoring the most recent image copy of data.

Therefore, it would have been obvious to one having an ordinary skill in the art at the time of the Applicant's invention to modify the second storage server to include an image volume so that the data can be recover in case the file in the storage volume is corrupted or lost.

As per claim 3, Yanai et al. sending a synchronization request at the second storage server from the first storage server when the first portion of the non-volatile storage device in the first server is full (see col. 10, lines 19-23); wherein as discussed in claim 1 above, the data is transferred from cache to R1 and R1 synchronize the updated data with R2.

As per claim 4, Yanai et al. discloses a method comprising:

sending an acknowledgement from the second storage server to the first storage server in response to receiving the data access request (col. 10, lines 19-24) to cause the first storage server to send a response to the client (col. 32, lines 26-27) after the data access request has been stored on the first storage server and stored in the mass

storage device on the second storage server. See col. 32, lines 49-57 and col. 2, lines 60-67.

As per claims 6 and 25, file is associated with the first portion of the non-volatile storage device in the first storage server is inherent feature of Yanai et al. since the data that stored in the second storage server is previously transferred from the cache, therefore they are associated or related with each other.

As per claim 7, Yanai et al. discloses a method wherein the data access request is transmitted from the first storage server to the second storage server over a network. (Fig. 12, items 240-241 and col. 12, lines 40-42)

As per claims 8 and 27, Yanai et al. discloses a method comprising:  
assigning a sequence number to the data access request, wherein the sequence number designates a position of the data access request in a group of data access requests to ensure that the data access request is properly ordered within the data container. See col. 18 lines 45-54.

As per claim 12, Yanai et al. discloses an apparatus wherein the network comprises a Transmission Control Protocol/Internet Protocol (TCP/IP) network. See col. 13, lines 7-13, wherein the TCP/IP is an inherent feature of the ESCON system.

As per claim 14, Yanai et al. discloses an apparatus wherein the memory comprises a nonvolatile random access memory (NVRAM). See col. 18, lines 5-9,



*wherein random access memory is backed-up by a battery power which makes the RAM becomes a nonvolatile random access memory.*

As per claim 15, Yanai et al. discloses an apparatus wherein the destination storage server modifies an image of a volume maintained by the source storage server on a second nonvolatile mass storage device (secondary volumes) coupled to the destination storage server according to the access request (col. 10, lines 50-58) when the source storage server makes a synchronization request (col. 10, lines 19-23).

4. Claims 17, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanai et al. (6,502,205) in view of McMillian, Jr., Achiwa et al. (US 20040153719) and Courts et al. (US Patent 5,636,360).

As per claim 17, Yanai et al. discloses a method comprising:

receiving a data access request at a destination filer from a first source filer (col. 9, lines 59-64, wherein the data is copied to the second storage system from the primary storage system and the data is externally influenced by a host coupled to the primary storage system), wherein the data access request is written to a first portion (Fig. 18, item 502) of a first memory (Fig. 1, item 228) coupled to the source filer (col. 7, line 66 – col. 8, line 1);

sending an acknowledgement to the first source filer in response to the destination filer receiving the data access request (col. 10, lines 19-24);

writing the data access request to a second memory (Fig. 1, item 64) in the destination filer (col. 20, lines 10-13);

transferring the data access request from the second memory to a file corresponding to a source filer on a volume managed by the destination filer (col. 20, lines 5-13);

receiving a second data access request from a second source filer (col. 2, lines 54-59), wherein the second data access request is written to a third memory coupled to the second source filer (col. 32, lines 55-56);

sending a second acknowledgement to the second source filer in response to the destination filer receiving the second data access request (col. 10, lines 19-24);

writing the second data access request to the second memory (Fig. 12, item 293, col. 32, lines 49-57);

transferring the second data access request from the second memory to a second file corresponding to the second source filer on the volume coupled to the destination filer (col. 32, lines 37-38; lines 49-53);

when the first portion of the non-volatile storage device in the first storage server is full, applying the data access request to a volume managed by the first storage server and causing the second storage server to apply the data access request to an image volume of the volume. See col. 20, lines 5-20, wherein the data is transferred from the cache to the R1 volume of the first storage server then the data is also transferred to the R2 of the second storage server.

Yanai et al. does not particular teach when a cache is full then the data is transferred to the secondary storage devices.

Court et al. teaches a method of copying the contents of a log buffer to a log partition when the log buffer is full (col. 2, lines 35-37).

Therefore, it would have been obvious to one having an ordinary skill in the art at the time of the Applicant invention modify the cache of Yanai et al. to implement the method teaches by Court et al. to arrive at the current invention. The motivation of doing so is to avoid the data currently storing in the cache to be overwritten by the incoming data when the data currently storing in the cache are critical or valuable data as being taught by Yanai et al. at col. 1, lines 47-56.

Yanai et al. did not explicitly disclose a method of removing the data access request from the second memory after transferring the data access request to the volume. However, McMillan disclosed a method of removing a request when an acknowledgement is transferred from one location to another (col. 5, lines 35-39). At the time of the Applicant's invention it would have been obvious to one having an ordinary skill in the art to recognize that it is advantageous to remove/delete the access request once the transaction is completed or the data has been transferred. The motivation of doing so is to prevent unnecessary data from transferring to the volume again and maintaining an appropriate operation of the system while increasing data throughput.

Yanai et al. does not disclose a second source filer coupled to the destination filer which performing the duplicate tasks as of the first source filer. However, Achiwa et al. discloses a system wherein there are multiple storage servers interconnected with

each other in order to replicate the copy of data stored in the storage device. See Fig. 1 and page 1, paragraph 0009, lines 1-12.

Yanai et al. does not particularly disclose the second storage server uses the file to recover the data in the image volume if a disaster occurs.

Yanai et al., however, discloses a method of restoring the most recent image copy of data.

Therefore, it would have been obvious to one having an ordinary skill in the art at the time of the Applicant's invention to modify the second storage server to include an image volume so that the data can be recover in case the file in the storage volume is corrupted or lost.

As per claim 19, Yanai et al. did not explicitly disclose a method of connecting a second source filer to the client in response to a system failure.

However, Achiwa et al. discloses a method further comprising connecting the second source filer to the client in response to a system failure. See page 1, paragraph 0006, lines 4-7.

It would have been obvious to one having an ordinary skill in the art at the time of the Applicant's invention to connect the source filer to the client in response to the system failure. The motivation of doing so is to provide a stable storage system since there are additional sources to take over the operation process if one of the other sources failed.

As per claim 20, Yanai et al. discloses allowing the client to access the image.  
See col. 17, lines 25-40.

As per claim 26, Yanai et al. discloses the mass storage device includes a disk.  
See col. 7, lines 60-63.

### ***Allowable Subject Matter***

Claims 22 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Response to Arguments***

5. Applicant's arguments filed on November 2, 2007 have been fully considered but they are not persuasive. Applicant's amendments result a new ground of rejection. All rejections are currently presented above.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh D. Vo whose telephone number is (571) 272-0708. The examiner can normally be reached on M-F 9AM-5:30PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reginald G. Bragdon can be reached on (571) 272-4204. The fax phone

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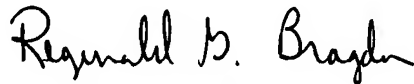
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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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